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SPE NEWS

SPE NEWS

Issued Monthly to all Members of the Society of Plastics Engineers

Vol 3 No. 3 March, 1947

INFRA-RED in the Plastics Industry

BY WILLIAM J. MISKELLA

The infra-red equipment business is a comparatively new and rather peculiar one. Indeed, we have seen many changes and innovations since our entry into the field in 1937. For example, one may buy infra-red lamps and secure seemingly satisfactory results in a home-made specific application. However, overlooked is the operating cost which after all is the controlling factor, since it is presumed that the oven or device will operate day in and day out for several years after it is made.

When radio, for example, first became popular, we were forced to build our own receiving sets, but who would think of doing so today? We know, for instance, of one home-made infra-red installation in a mid-west city which uses 224 250-Watt infra-red lamps, whereas a properly engineered equipment would require only 64 250-Watt lamps! Based upon a current cost of 1c per KWH, this means 56c per hour vs. 16c per hour; in other words, a 40c loss each and every hour the equipment is operated.

Basically, an infra-red oven forms a part of a production system and therefore should be given the same design and detail attention as any other part of the equipment. By co-ordinating cost of operation with proper flexible appointments, the user can be very happy indeed. It is evident that such a problem involves much more than the wiring in of a few lamps selected from the many infra-red bulbs available. Here again, one may refer to the radio example and ask the average layman-how if he knows which particular tube to use.

One must combine the best features of oven construction, and power utilization, and heat distribution with proper control and material handling. To select the best combination of these elements and resolve them into a praiseworthy result requires:

(a) A thorough study of the heat processing problem and final recommendations based upon basic facts.
(b) Sound infra-red engineering based upon long successful experience as well as an intimate knowledge of the related facts such as; properties of paints, conveyor speeds, gear reductions, handling methods and factory processes.

There are two general types of infra-red lamps, clear bulb and those in which the reflector is sealed in. Obviously, the clear lamp has to be associated with an exposed reflector, which means one must periodically clean the lamp and the reflector, while in the fixed-focus type this is not the case since only the face of the lamp needs to be kept clean.

It is the practice in the infra-red industry to mount both the clear bulbs and the reflector bulbs at a 90 degree angle, as indicated in the right-hand view of Fig. 1. However, the reader should note how simple a change from 90 degree

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William J. Miskella is president of the Miskella Infra-Red Co. of Cleveland. A graduate of Cornell, he is the author of several books on painting and enameling. His latest book, Infra-Red in industry, was published this year. He is a pioneer in equipment for preheating and dryheating, and drying plastic powder, his first dryer having been offered in 1940. During the World War he was commandeered to operate the world's largest production painting job.

SPE NEWS

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SPI - SPE

A Letter from the President —

To Members of the National Council of S. P. E.:

In order that you may be advised of developments in connection with SPI, an outline of meetings is rendered below.

You are familiar with our first meeting with Mr. William Cruse in New York City on April 25, 1946; also our second meeting in New York City on September 14, 1946 with special committees of SPI and SPE, and in Chicago on October 23, 1946 with the same committees. In Chicago on January 29, 1947, a Special Committee of PMMA met with the SPE Committee offering its services toward the end of coordination of engineering activities in the plastics industries. This special PMMA Committee returned to the PMMA board and obtained authority to continue its liaison function between SPI and SPE. On February 18, 1947 at Niagara Falls, Ontario, this special PMMA Committee met with the SPI board and secured a proposal from SPI which was presented to the SPE Executive Committee at a meeting on February 19, 1947 at the same place. This proposal is as follows:

JOINT EXPRESSION OF PURPOSE
SPI & PMMA Directors 18 January, 1947

We agree that the engineering activities of the industry must be unified.

The SPI because of its company membership will provide the funds and facilities to make such unified activity possible.

The organization of this unified activity be such as to permit:

1. Its autonomy.
   (a) Selection of its own officers.
   (b) Arranging its own programs.
   (c) Conducting its own meetings, local and national.
   (d) Governing all other engineering matmatters.
2. Representation on SPI Board of Directors.

To implement the foregoing the SPI Board of Directors agree to recommend to their membership a class of associate membership which will make possible the inclusion of all such individuals who can contribute to such work.

The details of such associate membership as proposed to date are attached.

If the suggested plan to this point is acceptable all paid up members of SPE at that date become members of SPI under one of three categories:

1. Individual member under existing SPI by-laws.
2. Associate member pending adoption of new SPI by-laws.
3. Professional member under existing SPI by-laws.

The details of the timing and payment of dues in connection with the transition will be left to the committee concluding the arrangements for unification.

It is recommended that an immediate meeting be arranged between the National Council of SPE and the SPI Engineering Division to fix the organization, the name, and the officers of the new group all to become effective at the time the memberships of both organizations approve the plan.

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Notice

The National SPE office is now in Cleveland, Ohio, and the office at Birmingham, Michigan has been closed. All correspondence and business with the National office of the SPE should now be addressed to Lake Ave. at 85th, Cleveland, Ohio. Phone ME. 6500.

Plastics Movies Available

A number of interesting films are available which are suitable for SPE section programs. Program chairmen should write directly to the firm which issues the film. Notice of new films being issued is desired by the SPE News.

1. Basic Hydraulics — by Hanna Engineering Co., Chicago, Illinois.
2. Electronics — by Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota.
3. Division of Visual Aids for War Training — by United States Office of Education, Washington 25, D. C.
   PLASTICS SERIES:
   (a) Origin and Synthesis of Plastics Materials
   (b) Methods of Processing Plastics Materials
   (c) Preparing the [illegible]rge and Loading the Mold
   (d) Molding a Simple Part
   (e) Molding a Part with Inserts
   (f) Semi-automatic and Hand Molding of Intricate Parts
   (g) Setting up the Press and Molding a Part (Injection)
   (h) Cleaning and Servicing the Press
   (i) Finishing Molded Parts
   (j) Machining Laminated Plastics

CASEIN PLASTICS

By S. PELLERANO

Mr. Pellerano is a chemist and technologist, a specialist in synthetic resins and plastic composition, with offices at 1918 Seventy-first Street in Brooklyn, N. Y.

The first important industrial application of casein plastics dates back to the year 1899 with the establishment of a firm in Austria by Krische and Spitteler. They later adopted the trade name GALALITH and in 1904 combined French and German interests to form the International Galalith Gesellschaft Hoff & Co., who pioneered and made some of the most important contributions to the field of casein plastics.

At first, casein plastics were produced by the so-called "wet process" which consisted in the employment of solutions of casein in alkalies. This, however, gave way to the more desirable and now universally used "dry process" which consists in converting or plasticizing the moist casein into a homogeneous horny mass.

Casein plastics for the largest part find employment in the manufacture of buttons and slides, although in Europe such articles as pencils, knitting needles, pens, pipe stems and various novelties are being manufactured from this material. In the beginning on account of its uninflammability it replaced celluloid. The material resembles horn in many instances and it has the same characteristic odor of nitrogenous substances when burnt. Casein plastics range in specific gravity from 1.31 to 1.35; are odorless and extremely tough. It may be produced in all ranges of delicate colors from transparent water white to beautiful veined and nacreous effects. It is easily machined, and may be polished to a high finish. The most serious disadvantage of casein plastics is their susceptibility to moisture and humidity, making the material undesirable for applications which require dimensional stability.

As pointed out above, the "dry process" is now almost exclusively used. For this process rennet casein is used, although small percentages of acid casein or soya alpha protein may be added. Rennet casein is difficultly soluble, and swells when in contact with water. In contradistinction to acid casein which is produced by coagulating the skim milk with acids, rennet casein is produced by precipitation from the fresh totally skimmed milk by the action of rennet. After the curd has settled it is washed, drained and carefully dried in continuous driers at a temperature of 110 to 115 degrees Fahrenheit. Proper precipitation involves considerable details and conditions of temperature, agitation and concentration of precipitating agents. The rennet casein should be in the form of clean, translucent, slightly yellow granules, and uniform in color. It should have a very slight smell and when in powder form, if boiled with water for one minute the granules should swell evenly without coagulating. In the process of precipitation the addition of bleaching agents such as hydrogen peroxide have been found to improve the color. The fat content should be very low, preferably not exceeding .5%, and the ash should be high, usually about 8%. The moisture content should range from 10 to 12% and the acidity expressed as lactic acid should not be over .2%.

MPR 289 of the Office of Price Administration defined rennet casein as cream to light yellow, nearly odorless with not more than a trace of sourness. It specified a moisture content of not more than 10% and a fat content of not more than 1% (moisture free basis). It should have not less than 14.2% nitrogen (moisture-fat-ash free basis) and not less than 7.5% ash (moisture free basis) and the total acidity should be not more than 2.5cc of N/10 alkali per gram of casein.

Prior to World War II the United States produced almost ¼ of the total world supply of casein, while Argentina followed close second. The United States production in 1945 reached 47,346,000 pounds, of which about 7% was utilized for the production of plastics. However, due to the diversion of skim milk for other uses, the output decreased very sharply to about ⅓ of the above amount.

Production of Casein Plastics

Grinding: Rennet casein as it is obtained, after the curd is dried is in the form of large granules which must be ground to pass a 20 mesh standard screen and retained on a 80 mesh screen. Hammer or roller mills are used for this process and the casein is passed over a magnetic separator to remove any particles of steel which may contaminate it. There seems to be a difference in the product ground by the different types of mills, very likely due to a difference in particle shape which may change the water absorption rate.

Mixing: The mixer almost exclusively used for casein plastics is the "ARTOFEX" dough mixer. It is convenient in that it is equipped with removable bowls or cans which permits flexibility in mixing operations.

The weighed powdered casein is placed in the mixer and while rotating the proper amount of water, preferably distilled and free from traces of iron, is added in the form of a spray. The mixer rotates at a speed of about 20 RPM. Any dyes that may be added are dissolved in the water to which are also added plasticizing agents, such as glycerine, sulfonated castor oil, and tricresyl phosphate. The latter is best employed in the form of a water dispersible emulsion available on the market.

Tricresyldiphenylamine (Pandol A) is used to

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Casein Plastics (Cont'd from page 3)

obtain transparency, usually 2 to 3% being used, dissolved in 5% of the amount of casein of ethyl alcohol.

In 1929 P. C. Christensen discovered that the addition of soluble alums to the casein gave on extrusion a rod tough enough to be machined and cut into buttons on automatic machines, before hardening with formaldehyde. This had the advantage that the shavings and other unformolized waste could be reused and reextruded. Also it eliminated much material which beforehand was machined off after formolizing, thus in a way reducing the time of the formolizing period to a minimum. This process was soon copied by other button manufacturers. Generally to 100 lbs. of powdered casein 4 lbs. of a saturated solution of alum and 24 lbs. of water are added. Acid dyes are usually employed and such as are resistant to the action of formaldehyde and of sodium hypochlorite used later in the chemical dip polishing process.

For the production of pearlescent and nacreous effects aluminum bronze powder is used. Hunsdiecker patented the use of lead acid phosphate which gives light pearlescent effect and is resistant to formaldehyde. About 1 or 2 grams of the pigments to 1 kilogram of casein are used and added to the casein in admixture with the water plasticizing agents and alcohol. Beautiful colored effects may be also obtained by flourescent dyes.

During the mixing operation the temperature increases due to the heat of absorption of the water by the casein, and mixing should be continued until the mass has cooled off and a homogeneous and non coagulating blend is obtained. The wet casein is then screened through a ¼ in. mesh screen to break up any lumps, and it is then allowed to stand in a closed container from 2 to 12 hours before extruding in order that moisture absorption should be complete.

Extruding: A screw extruding machine, similar to the ones used for extruding rubber is employed. This machine essentially consists of a revolving screw fitted into a jacketed cylinder provided with a feed hole at the back and a nozzle at the front. Over the feed hole a hopper fitted with a stirring device regularly to feed the moist casein, is provided. At the front of the screw, one or more perforated steel grids are provided and the screw sometimes is fitted with a propeller used for orienting the pigments in the production of pearlescent or nacreous effects. Various modifications are made in the pitch and design of the screw to obtain maximum efficiency in feeding and plasticizing action.

The jacket of the cylinder is divided into two sections; one at the back and the other in the front of the cylinder. Cold water is circulated through the back jacket and water at 80 degrees Centigrade is circulated in the front jacket. It very important that the temperature be closely thermostatically controlled. The nozzle is heated either by steam, gas or electricity. As it is to be expected, there are numerous modifications of the machine and nozzle which cannot be treated in this brief article.

The casein may be extruded in the form of rods, ribbons, tubes, etc. The extruded rod is cut into lengths of about 3 feet, and immediately dipped in circulating cold water; or more desirable the rod may be led immediately into a bath of circulating cold water. The immediate cooling after extrusion is important in minimizing the number of pinholes which may be found in the extruded rod.

When cooled, rods may be fed to automatic screw cutting machines adapted to the production of buttons, or else they may be sliced on automatic slicing macines into blanks from which buttons are shaped on automatic button cutting machines.

Sheets are formed by loading rods into a mold and then pressing in a hydraulic press of the multiple platen type. In this process beautiful effects similar to the nacreous or veined creations obtained from celluloid or cellulose acetate may be produced. The platens of the press are arranged so that they may be heated and cooled alternately and the press is operated with a low and high pressure as per standard practice.

By introducing at regular timed intervals small pieces of extruded casein into the powder during the extruding operation, veined or streaked effects are obtained, which may also be oriented by means of a propeller fitted at the end of the screw, and just before the nozzle, to give various mottled designs.

Lately, beautiful two and three colors effects have been obtained by combining two or more extruding machines to feed into a distributing head. In the very latest development the colors are kept distinctly separated without blending into each other and beautiful multicolored designs remarkably symmetrical are produced.

The moist casein powder can also be plasticized on rolls before going to the extruding machine, also at least in one case in Europe the casein powder is fed on to injection presses and the article thereafter hardened by immersion in formaldehyde.

Hardening: After the casein plastics articles have been shaped or formed by machining, swaging, pressing or injection they are immersed in a bath of formaldehyde usually of 5-6% concentration. It is important that the concentration of the bath be maintained at the proper level and that the pH value be kept at 4.0 to 7.0. The temperature of the bath should be thermostatically controlled and maintained at 60-70 degrees Fahrenheit, and the solution kept uniform in concentration by circulating it at intervals by suitable pumps.

Small articles such as buttons are preferably hardened by placing them in a rotating perforated drum immersed in the formaldehyde solution. In this manner continuous perfect contact of all the surfaces with the formaldehyde is assured.

The formaldehyde curing room should be well ventilated or preferably a closed system should be used. It is to be noted that formaldehyde is

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Northwestern Pennsylvania Begins 1947 Season

By J. R. SCHUMACHER

The Northwestern Pennsylvania Section of the Society of Plastics Engineers, Incorporated, has officially opened its 1947 season. The first meeting was held on Thursday, Feb. 13th, at the Kenyon Hotel in Erie. The speaker for the meeting was Fred B. Stanley, Engineering Editor for Modern Plastics Magazine who spoke on "Products for the Future". In his talk he gave a resume of some of the many new machine tools now in use in the plastics industry. Mr. Stanley's talk was not overly technical and was interestingly illustrated with slides; his debonair manner held everyone's close attention. A film entitled "The Formica Story" was also shown, courtesy of The Formica Insulation Co., Cincinnati, Ohio.

Mr. Paul C. Roche, the new Section President, gave an outline of the Section's plan of activities for the year. The main theme being, a larger membership drive and bigger and better programs. Keep your eyes on this Section, things are really popping.

The next meeting was held on Tuesday, March 13th, at the Kennyon Hotel in Erie, Pa. The speaker for the evening was Mr. Thomas Trowbridge, Assistant Manager, Equipment and Products En'g Dept., Behr-Manning Division of Norton Co., Troy, N. Y. His subject was "Efficient Finishing Operations for Molded Plastics". A moving picture on Die Casting Techniques was shown on the same occasion.

Mr. Kenneth A. Rouzer, Vice-President of The Northwestern Pennsylvania Section, Society of Plastics Engineers, Inc., has just joined Acorn Plastics Engineers, Inc. of Erie, Penna., as Vice-President. Mr. Rouzer was formerly Vice-President and General Manager of Presque Isle Plastics, Erie, Penna.

DONAHUE AT TOLEDO

By A. E. GIESLER

The Toledo Section of the SPE swings into its March meeting with a talk by Mr. Frank J. Donohue, Technical Expert for the Monsanto Chemical Company of Springfield Massachusetts. Mr. Donohue will present his paper on, "Properties of Plastic Molding Compounds."

The March meeting is being held in the Ohio Building. Three short movie subjects will follow the meeting.

SPE Members Contribute to Plastics Course at JHPI

Members of the Cleveland Section have given liberally of their time to assist in the course given at John Huntington Polytechnic Institute in cooperation with the Educational Committee of the Section.

During the semester just passed, Hugh Winn, Scott Moulton, Ren Morse, Dan Kent and Bill Johnson prepared one or more lectures for the beginning and intermediate courses in Industrial Plastics. During the current semester Wm. Hubbard, Celanese Plastics, Geo. Koch, B. F. Goodrich Chemical Co., Dick Kidney, Plastics Tech and Gregg Langermeir, Pioneer Mold Co. were added to the role of volunteer instructors.

The class was honored to receive an invitation to visit the plant of Atlantic Plastics and Metal

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"SPE Consumer End-Use Specifications In The Business Machines Field"

By B. W. NELSON and G. J. WILSON *A Committee Report*

This paper is not intended to bring to you information on new products, methods, or materials. It is intended only as a progress report on the activities of the Business Machine Group of the National Consumer Specification Committee. Through the efforts and contributions of the members of this group—representing ten leaders in the Business Machine Field—we now are able to show more clearly than ever before how End-Use Specifications can be established and used effectively.

Those who have contributed to this program are: International Business Machine Corporation; Addressograph-Multigraph Corporation; Underwood Corporation; Royal Typewriter, Incorporated; The Shaw-Walker Company; Victor Adding Machine Company; Monroe Calculating Machine Company; L. C. Smith and Corona Typewriter, Incorporated; Burroughs Adding Machine Company; National Cash Register Company.

Although the program is by no means completed, the objectives are better defined, and the remaining steps necessary to attain these objectives are more apparent to all of us.

This might be the opportune time to restate the purpose of this committee. Let us quote from the remarks made by R. G. Chollar at last year's meeting in Detroit—"Speaking as a consumer, I feel that it is altogether proper to propose that the misapplications of plastic materials have not been, as popularly supposed, predominantly due to the sources of supply, but perhaps more to the ignorance and the lack of inquisitiveness of the engineer and user of these materials. The situation is gradually developing in which the user, particularly the designer, will specify the properties he desires, and the material will then be synthesized for him exactly filling his needs. While it is true that nature and the synthetic chemical industry have already provided us with a wide choice of materials, it is up to the consumer to point the way for the necessary properties which can be made available by the aid of the synthetic age."

The final culmination of this idea as we now see it, is probably several years away. There were and are several steps necessary to be carried through in the meantime:

First, the establishment of the various classes of parts and a working definition of each class.

Second, selection of example parts for each class which are representative of the Business Machine Field.

Third, correlation of tests necessary to check parts under each classification.

Fourth, standardization of test methods.

After standard test methods have been worked out, approved, adopted, and used for some time, we believe that any lack of properties needed in a material for a certain classification will be self-evident. An effort to obtain the known required properties can then be made.

To date we have covered the first three steps and in the coming year expect to be fairly well along on the fourth.

In order to carry out these steps, it was necessary to classify and catalog the miscellaneous plastics parts now in use by the Office Equipment Manufacturers throughout the United States.

With reference to the ten companies who are members of this committee, we feel that the following pertinent data would be of general interest to you.

Three companies do their own molding, while seven depend on custom molders.

Nine companies do their own testing, while one company requires his parts supplier or an independent laboratory to do the testing.

Four companies make actual life tests, while six do not. All ten companies make special tests.

Plastic parts as used by these companies were divided into five separate classifications, namely:

1. Decorative
2. Electrical
3. Optical
4. Structural
5. Mechanical

The following definitions and examples represent the majority opinion of the manufacturers contributing:

(1) A **Decorative** part is one used primarily for ornamentation of the product. Its appearance must be maintained for harmony with the equipment and surroundings. It may be used for appearance in conjunction with a mechanical metal part. Example: Name plate, key top, trim or moulding, indicator, etc.

(2) An **Electrical** part is used to insulate one metal part from another or to insulate an electrical current from a metal part. It may also act as a mechanical part in conjunction with insulation. Example: Brush holder, speed regulator, switch block, terminal block, jack spacer, magnet coil spool, commutator, connector plug, insulating bushing and washer.

(3) An **Optical** part transmits light or vision. Example: Window, line guide, transparent cover, etc.

(4) A **Structural** part is one which is used as a supporting member, housing, or structural member which has no motion of its own. Example:

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CENTRAL OHIO MEETS

By C. W. COOPER and L. E. CHEYNEY

The monthly meeting of the Central Ohio Section of the Society of Plastics Engineers was held on February 21, at 7 p. m. in the Zane Hotel, Zanesville, Ohio.

Dr. W. H. Aiken, Assistant Manager, Plastics Department, Goodyear Tire and Rubber Co., Akron, Ohio, was the principal speaker. Dr. Aiken during the war held the rank of captain in the U. S. Army Quartermaster Corps where he was in charge of research on plastic films and coated fabrics. He is an expert in the field of polymers and is a graduate of the Institute of Paper Chemistry. His subject for this meeting was Plastic Films.

Nineteen members and eleven guests were present. J. W. Knight reported upon the January show and technical sessions at the annual meeting in Chicago. L. E. Cheyney reported upon the combined Council—Local Section Officers' meeting held in Chicago. The national membership campaign being held during February and March was discussed and plans made for the participation of the local section in the national campaign. It was announced that the next meeting would be held in the clubrooms of the Ohio Plastic Co. at Frazeysburg, Ohio, on March 21, and that the limited seating capacity there would make it necessary to restrict attendance to local section members.

The committee appointments include:

Program: R. L. Savage (ch.), G. N. Edward, C. Ebner, R. J. Francis, J. E. Henry.

House: C. D. Jones (ch.), M. W. Burkhart, R. D. Beck, F. B. Hill.

Finance: G. W. Keny (ch.), E. E. Laughlin, R. C. Williams, R. L. Davis, L. James.

Publicity: C. W. Cooper (ch.), H. R. Parsons, S. Cash.

Membership: H. W. Kuhlmann (ch.), R. D. Beck, R. L. Davis.

Credentials: C. D. Jones (ch.), H. C. Simons, M. W. Burkhart, L. A. Monaco.

Professional Activities: E. E. McSweeney (ch.)

Advisory Council Representatives: J. W. Knight, L. E. Cheyney.

Section Calendar

Regular meeting dates for Sections are on the day of the month designated, and the time and place are as shown, unless otherwise announced.

Central Ohio—3rd Friday. Places as announced.

Cleveland—Last Friday, Tudor Arms Hotel. Dinner at 6:30, meeting at 8:00.

Detroit—4th Friday. Rackham Memorial Bldg.

Newark—2nd Wednesday. Military Park Hotel. Dinner at 6:30, meeting at 8:00.

N. W. **Pennsylvania**—2nd Thursday. Kenyon Hotel, Erie, Pa.

Philadelphia—3rd Monday. Franklin Institute.

Western New England—1st Wednesday. Hotel Sheridan, Springfield, Mass. Dinner at 6:30, meeting at 8:00.

Petretti and Dunnican Are National Directors From Two New Sections

Mario Petretti has been in the Plastics Industry for fourteen years, having started at the bottom and working up the hard way. He has formerly been connected with the Leviton Works Mfg. Company, Brooklyn, New York in a supervisory position and at the present time is engaged in the capacity of General Manager of the Plastics Division of Noma Electric Corporation, Holyoke, Mass.

He has been a member of the Society of Plastics Engineers for four years, originally with the Newark Section, and upon the organization of the Western New England Section, he transferred his membership there. At the present time, he is President of the Western New England Section.

William J. (Bill) Dunnican is a Field Engineer for DURITE PLASTICS INC., of Philadelphia 24, Pa. Bill is one of the young "Old Timers" in the Industry and is a Member of the Society of the Plastics Industry's "PLASTICS PIONEERS," and PMMA's Technical Committee. He first became affiliated with the Industry when he was employed by Garfield Mfg. Co., cold molders in 1918. During 1930 he joined a concern that became Reilly Tar & Chemical Corp. handling their Plastics and Chemicals in the Mid-west area. He was transferred to New York in 1940 to manage the Plastic Division.

Bill became affiliated with DURITE in 1943 as a Field Engineer handling their Plastics in New England, Eastern New York and N. J.

Dunnican is Eastern Regional Membership Chairman and has already organized two new Sections, Western New England and Rhode Island & Southeastern Massachusetts. He was originally a member of Detroit Section but has transferred to R. I. & S. M.

Casein Plastics (Cont'd from page 4)

injurious and has a definite detrimental effect on the individual. With the increase of the utilization of this chemical in the plastic industries some states have already become aware of the hazardous effects of this chemical and are scrutinizing its operation. It is to be hoped that more investigations will be made as to the effects of formaldehyde on the individual.

The formaldehyde bath should be regularly tested for concentration and pH value. The material should also be examined for penetration of formaldehyde by cutting and testing the pieces by immersion for one minute in boiling water containing a little ammonia. Unhardened surfaces are indicated by swelling.

The time of hardening varies with the thickness of the material. Experiments have shown that a 2mm thick blank will harden in 3 days while a 15mm thick blank will take as much as 105 days. Many experiments have been made towards accelerating this hardening by the addition of various electrolytes to the formaldehyde bath. It has been found that zinc salts as well as sodium fluoride gave good results.

Drying: When the casein articles have been hardened they are washed to remove excess of formaldehyde and then dried. In the case of buttons they are usually rotated in a screen drum at room temperature. The drying is very important and should be carried out under controlled conditions of temperature and humidity. The temperature should at no time exceed 45 degrees Centigrade. Quick drying and elevated temperatures cause warpage and cracking.

Polishing: Casein plastics take a lustrous and pleasant finish. The surface may be ashed with powdered pumice in tumbling barrels or on buffing wheels as per usual polishing procedures for plastics. Casein has also the advantage in that it takes a beautiful polish by dipping in a chemical bath containing a solution of sodium hypochlorite. The articles to be polished are placed in a bath of such chemicals heated to just below the boiling point of water and kept stirring occasionally for about 15 minutes, depending on the concentration of the sodium hypochlorite. When removed they are washed and dried. A wax finish may also be given by tumbling.

There are many details to the manufacture of casein plastics requiring meticulous care. There is much to be done in the way of research in the various phases of production of this plastic. Indications are that improvements in the hardening as well as the water resistance of this material are feasible and perhaps when conditions in the production of casein are more favorable we may expect a revival of interest in this field.

This article should not be concluded without calling attention to the progress made in the manufacture of fibres and films from casein which again indicate the possibilities of this material.

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NEWARK NEWS

By EDWARD B. SOULES

On March 12th members and guests of Newark Section attended a dinner and meeting at the Newark Athletic Club. Speakers of the evening were Mr. S. L. Brous, Sales Development Manager of the B. F. Goodrich Chemical Co. of Cleveland, Ohio, and Mr. Gerard A. Albert, Sales and Development, Manager of National Vucanized Fiber Co., Wilmington, Delaware.

Mr. Brous addressed the meeting with an interesting talk on "New Allyl Casting Resins." Mr. Albert spoke on "Laminated Phenolics and Vulcanized Fibers," illustrated by colored slides. At the conclusion of each talk, the meeting was opened for informal discussion and questions, which is the usual procedure at all Newark meetings.

A final feature was the showing of the motion picture "The Flow of Metal Into Molds" by the Meehanite Metal Corp. of New Rochelle, N. Y. The dinner was excellent, and, as usual, Gene Fortney had a goodly number of door prizes to be distributed (which the boys from Newark Die take home with surprising regularity).

Newark Section of SPE is maintaining an office at 16 Clinton Street, Newark, N. J., which is available to anyone seeking information on plastics. Jim Growley, Chairman of the membership committee, has requested that all members cooperate with the SPE national organization in its drive for new members. Newark Section should have no difficulty in meeting its quota.

Following the highly successful joint meeting of the Newark and New York sections held in Newark in February, the New York section has reciprocated with an invitation to the Newark Section to attend the regular New York meeting on April 15th. This promises to be a record-breaking affair, as approximately 300 members and guests attended the joint session held in Newark last month.

Arrangements are now being made for the second annual dinner-dance of Newark Section to be held at the Essex House in Newark late in April. Islyn Thomas, Chairman of the dinner-dance committee, will announce the exact date when arrangements have been completed.

Tony Terpak, Treasurer of Newark Section, has announced the removal of the office of Modern Plastics Engineering Co. to the Raymond-Commerce Bldg. in Newark. Wally Gryce will be in charge of this office, while Tony is busy at his newly-opened office in Providence.

Ed Rowan has announced the opening of the new offices and factory of the Dillon-Beck Mfg. Co. in Hillside, N. J. "Open House," with music and refreshments, was held on February 28th.

Islyn Thomas, former president of Newark Section, has just completed his book "Injection Molding of Plastics." It is published by the Reinhold Publishing Corp. of New York City, and contains much valuable information and illustrations, most of which deal with the mechanical detail of presses, mold design and operating techniques. This publication should be welcomed by the industry.

CLARK SPEAKS AT PHILLY

By S. J. NOCITRA and G. ELMENDORF

This regular meeting was highlighted by having Geo. W. Clark, past president of the national S.P.E., as the guest speaker of the evening. Mr. Clark is affiliated with Owens-Illinois Glass Co. and lectured on "Molding Powders and Bottle Closures." His talk was accompanied with appropriate lantern slides.

While bottle closures are taken for granted by by most of us, Mr. Clarke's talk revealed the multitude of "Behind the Scenes" processes, research and associated work necessary to produce so simple an article which today is almost a necessity for our every day mode of living. He explained how certain bottled materials required venting to relieve pressure build-up in the bottle, and at the same time prevent some of the contents from leaking out. He also told of many other problems that had to be solved in order to provide suitable closures.

Our Fellow member Mr. J. C. Graf, reported to us on the proceedings of the recent S.P.E convention in Chicago. Eleven members of our chapter attended this convention.

R. V. Beshgetoor, president, and Richard Foote, vice-president, both delivered papers and the following other members attended: G. A. Albert, R. B. Bishop, Dr. C. W. Gayler, Edmund Greene, J. C. Graf, F. M. Maly, H. E. Shearer, G. H. Sollenberger, M. Sperber

Mr. W. O. Bracken, chairman of our membership committee outlined his plan of action for a drive to increase the membership of our chapter. All members are urged to cooperate with him to make this plan a success for increasing our local membership.

ST. LOUIS NEWS NOTES

By J. MAVER FEEHAN

Prior to the February meeting of the St. Louis Section, held on Feb. 19, 1947, it was decided not to have the usual dinner at 6:30 p. m. but to meet at 8 and then have coffee and sandwiches later, with cards for those who wanted to stay following the refreshment. The attendance did not suffer from this change in time and the members seemed to like the arrangement.

The speaker was Mr. J. Kenneth Craver, Plasticizer Coordinator, Monsanto Chemical Co. whose subject was "Effect of Plasticizers on the Mechanical Properties of Plastics." After defining plasticizers as "Something added to make material plastic," Mr. Craver went on to point out the general action of plasticizers and also relate some of the difficult and often humorous problems presented to him.

At the March meeting, the St. Louis Section will hear Mr. Casper Strong of Bakelite Corp. who will talk on the "Use of Plastic Resins in Woodworking."

for PLASTIC ENGINEERS. . . it's

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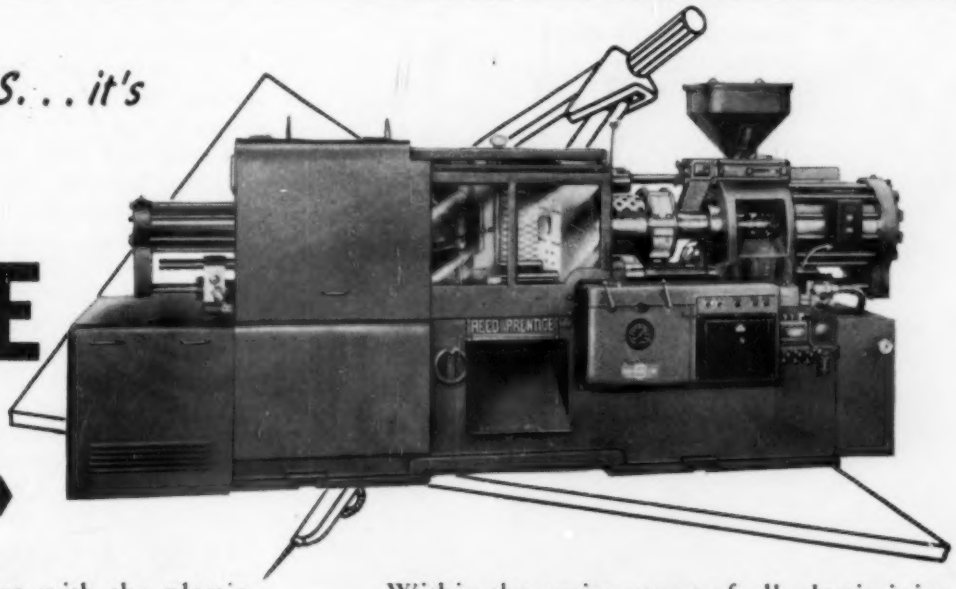

The World's most popular model — the 10D-8 Oz. injection molding machine.

Only engineers conversant with the plastic industry can appreciate the excellent design of the entire line of Reed-Prentice plastic injection molding machines. Constant improvements over a 10 year period have perfected the many practical features included in the design and construction of these machines. Today, they are unsurpassed.

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Consumer Specifications

(Cont'd from page 6)

Machine case, machine cover, motor housing, tray, coin slab, etc.

(5) A **Mechanical** part is one which has some mechanical operation or movement of its own to perform, or which is subjected to mechanical stesses. Example: Motor bar, operating handle, gear, friction disc, and clutch, pulley, carrying handle, twister knob, caster, wheel, etc.

Each working member of the committee has cataloged representative parts used by his company according to its proper classification, listing its usage, the type of test it was subjected to before adoption, and the A. S. T. M. material classification.

In each functional classification it was found that certain factors were established as vital in such plastic application. We have listed the classifications of function and their respective vital qualities as follows:

(1) Decorative
- a. Color stability
- b. Mar or abrasion resistance
- c. Cold flow
- d. Dimensional stability
- e. Delamination
- f. Filler adhesion

(2) Electrical
- a. Heat resistance
- b. Arc resistance
- c. Track resistance
- d. Dimensional stability
- e. Dielectric
- f. Oil resistance
- g. High-voltage breakdown

(3) Optical
- a. Light transmission
- b. Heat distortion
- c. Dimensional stability
- d. Mar and abrasion resistance
- e. Static retention
- f. Permanency of optical properties

(4) Structural
- a. Shock or Impact Resistance
- b. Dimensional stability
- c. Abrasion resistance
- d. Heat resistance
- e. Chemical resistance
- f. Color fastness
- g. Cold stability

(5) Mechanical
- a. Accelerated aging (cracking around inserts)
- b. Impact
- c. Tensile
- d. Flexural
- e. Wear resistance
- f. Frictional properties
- g. Dimensional stability
- h. Perspiration resistance
- i. Damping characteristics
- j. Gear tooth strength
- k. Oil resistance

At this point three important phases have been considered. A number of manufacturers who have in common only the single point of producing products for a common field, have shown that their respective products embody applications of plastics common to all such products. We have grouped our applications by function and to each function we have ascribed the important properties the plastic must possess properly to satisfy the requirement.

We are now in the process of developing the fourth step referred to above—that of determining and developing the specific test methods which we can all agree will adequately evaluate any plastic for a specific application in our products.

BUFFALO ELECTS BORRO

By NORMAN E. WAHL

The annual business meeting of the Buffalo section was held at the Crystal Room of the Hotel Westbrook on February 21, 1947.

The following Directors and Officers were inducted into office at this time:

To the Board of Directors for three years: George J. Goepfert, The Carborundum Company, Niagara Falls, New York; Lawrence E. Fisher, Owens Corning Fiberglas Corp., 1711 Liberty Bank Building, Buffalo, New York; Haiman S. Nathan, Atlas Plastics Co., 52 Pearl Street, Buffalo, New York.

The following Directors have two years to serve: Edward F. Borro, Carroll A. Brinkert, John E. Miner.

The following Directors have the coming year to serve: C. C. Pickering, Jr., Philip K. Porter, Norman E. Wahl.

The following officers have been elected: President, Edward F. Borro, Durez Plastics & Chemical Corp., North Tonawanda, New York; Vice President, John E. Miner, Spaulding Fibre Company, Tonawanda, New York; Secretary-Treasurer, Norman E. Wahl, Cornell Aeronautical Laboratory, 4455 Genesee Street, Buffalo 5, New York; Advisory Board, Edward F. Borro, Dr. Philip K. Porter; Section Reporter, Norman E. Wahl.

The meeting was highlighted by two speakers: Thomas E. Orr, National President of SPE, who spoke on "Aims of the Society for the Coming Year", and by Clark Simmons of Durez Plastics and Chemical Corp., who spoke on "Casting Resins".

Plastics Course *(Cont'd from page 5)*

Parts Co. President Geo. Rosenfeld and his superintendent, Stanley Prusinsky each took two groups through the plant. The cordial treatment and efficient planning of the trip is appreciated by the class, the instructor and the Educational Committee. Tentative plans are now being made for a second trip through a member's plant.

The class, organized by our former section chairman, Warren Prince, is now led by Win Rupiecht, assistant editor, Industrial Plastics, as continuity instructor. Hugh Winn, instructor at Case School of Applied Science, is chairman of the Educational Committee.

MOLDING PUBLIC OPINION

By EDWARD G. ACKERMAN

Mr. Ackerman, in advertising and Sales promotion for Chemaco Corp. is a very active member of the Newark Section.

Nothing in the whole picture of postwar wonders has captured public imagination as did plastics and nowhere is there so much misinterpretation and confusion. Plastics although very young is a big and rich industry. Given great stimulus by the war it has accomplished in three years what would take 10 years under ordinary circumstances. However, much of the impetus given the industry by the war and universal postwar planning may be lost unless each and everyone connected with the industry realizes the importance and value of public relations—and does something about it. John Q. Public, the employes of the industry as well as potential manufacturers and designers of tomorrow's product must be made to realize that plastics is not synonymous with "substitute" and that it has a definite place in industry as a material that in many instances is far superior to any yet developed.

It is not difficult to appreciate the public's dilemma and realize the need for enlightenment. During the war the plastic industry responded to the country's need in a fashion that was little short of miraculous. New materials were formulated, new formulae adapted to meet ever widening needs, new methods and techniques were evolved to meet extraordinary demands. This period of concentrated accomplishment naturally placed plastics very much in the spotlight. The public's thirst for information has given rise to a flood of publicity that has left a bewildering and distorted picture in the mind of the layman. He hears that plastics have replaced metal, wood, rubber, glass and porcelain and has had pictures of all-plastic houses, cars and planes flaunted before his eyes. In fact, the public has been led to expect an all-plastic world presented on a platter to them.

While it is true that plastics have been substituted for almost every thing under the sun in some function or other and, in many cases have proved far superior to the material which they replaced, it is also true that under stress of war demands and shortages of other materials, very often a material was specified for a job for which it was completely unsuitable. The result was, quite naturally, a dismal failure. Each time some misguided enthusiast uses butyrate when ethyl cellulose should have been used, or attempts to make methyl methacrylate serve where only metal will be satisfactory, the industry as a whole suffers. Each mistake they make decides some manufacturer in another field that plastics are poor, inadequate materials, simply because some formula has been used to do something completely foreign to its potentialities.

The plastics industry has unparalleled public relation opportunities but like charity, it should begin at home. Public relations on a national scale is something to strive for, but it is urged that each section of the SPE promote the public relations program locally on the theory that the public relations achievements of the industry as a whole is the aggregate of the work done by each section in its own territory. In other words, local community relations should be the core of the SPE program to focus attention on its commendable objectives.

A step in this direction has been taken by the Newark Section. It has formulated plans in conjunction with the local press to inform the public of the important role the SPE plays in insuring industrial progress by means of the free interchange of engineering information between manufacturers and designers. Speakers and activities of the society as well as photographs will be published as widely as possible in the New Jersey area. From time to time various articles will appear encouraging proper and extensive use of plastics. The feeling is not to apologize or publicly acknowledge errors of the past, but to take an effective part in shaping the minds of the laymen toward a practical approach to plastics. The basic philosophy behind this campaign is to develop greater respect and confidence in SPE leadership.

No one person or organization can undertake this sorely needed public relations job. It should be the responsibility of each and every one connected with the plastics industry to educate the public and gain their respect. If we of the plastics industry are to continue to be a factor in our economic system, now is the time to begin molding public opinion.

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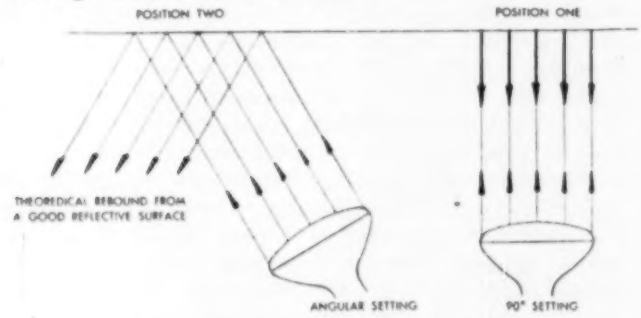
Infra-Red (Cont'd from page 1)

setting to angular setting improves the delivery of the heat which is primarily generated in the lamp filament.

Not only is the type of lamp and the number of watts it delivers important, but one must look to the arrangement of the lamps. In many home-made outfits, 90 degree lamps have been arranged either checkerboard fashion or diagonally, but as a general rule, when one makes a home-made outfit, he does not bother much about such detail.

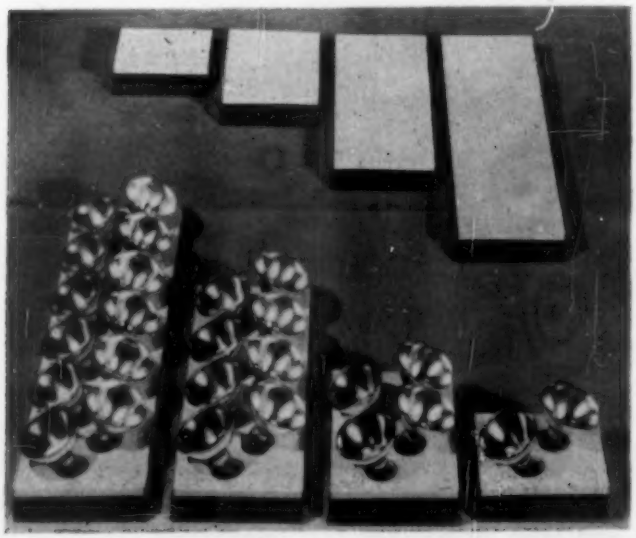
Standardized sections, like mechano toys, are now available generally from stock, as illustrated in Fig. 2, all the sizes of which illustrate angularly positioned lamps in insulated infra-red standardized panels and their counterparts also insulated, but without lamps.

In addition to the angularly directed heat, there is another very important design feature which is brought out in Fig. 3, showing the diagonal-arrangement of the lamps.



INFRA-RED IN COMPRESSION MOLDING

Much has been said about the use of induction heating of preforms, and there is little doubt that it is the ideal method where the preforms average in thickness much over one inch. However, there are hundreds of compression presses in operation on small preforms when it is not economical to use the induction process. When they realize that the basic cost of infra-red equipment for doing



this job is about 1/5 of what it would be for electronic heat, compression molders can go a long way toward adapting it to their production systems.

A word should be said about the processing of phenolic powder. This has not as yet been considered an ideal infra-red application due to the stickiness of the phenolic material. However, it is possible to process the powder by substituting shallow trays for the perforated ones if one must use the powdered material. In connection with another type of compression mo'ding, powder known as compression methyl methacrylate can be handled in the machine described later on for injection molding. This particular powder is not sticky and handles beautifully when vibrated past the lights under controlled temperature manipulation. Since this particular material is generally used for lenses and the like, it is very fortunate that such a material can be handled manually for the compression press molders.

INFRA-RED IN INJECTION MOLDING

An injection molder can hardly be without the use of infra-red in his plant, preferably at every machine. Many molding plants are equipped with a separate drying room quite far removed from the machine department. It is the practice to process the various kinds of powder used for hours. Obviously, when the material is taken from such a room and transported to the other department, it can easily be delayed in transportation during which time it can cool off, and also, it can take up more moisture.

(Continued on next page)

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Self-contained H-P-M compression presses are designed for economical mass production of thermosetting parts. Completely automatic, except for loading and unloading molds, their outstanding operating features include rapid mold closing, automatic slow-down, adjustable slow-close, breathing, rapid mold opening and automatic ejection.

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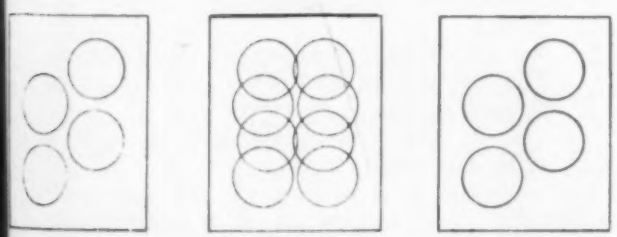
It is also impossible to heat cellulose acetate and other forms of plastic powder uniformly in pans unless the powder be left in the oven for long periods. The granules closest to the surface and adjacent to the sides of the pan and to the bottom are rather easily treated in a pan type oven, but when you consider the granules which are inside of the mass in the pan, it is little wonder that no moisture can be removed . . . and when it is not removed thoroughly, this same moisture contaminates the entire mass before it finally comes out of the injection molding machine, causing moisture defects or die lines.

Here it might be well to mention the practice of a number of injection molders who attempt to heat granular material in infra-red home-made ovens where the lamps are stationary, and where the granular material is in a pan, as previously mentioned in the convection type of oven. Here it is not possible to heat the material uniformly, and about the only thing to do is to have a workman come back every 15 minutes or so to stir the material so that eventually the entire mass will be in condition to go into the hopper. Here we have a labor factor injected which is easily overlooked when the urgency of getting out a certain job is paramount.

Closely related to this procedure is that of some molders who are processing granular materials on a canvas belt which carries it under the infra-red lamps. Here again the same analysis applies since these outfits operate only to take the moisture out of the granules nearest the lamps. But, they do not operate uniformly on the granules close to the belt which is also a non-conductor of heat.

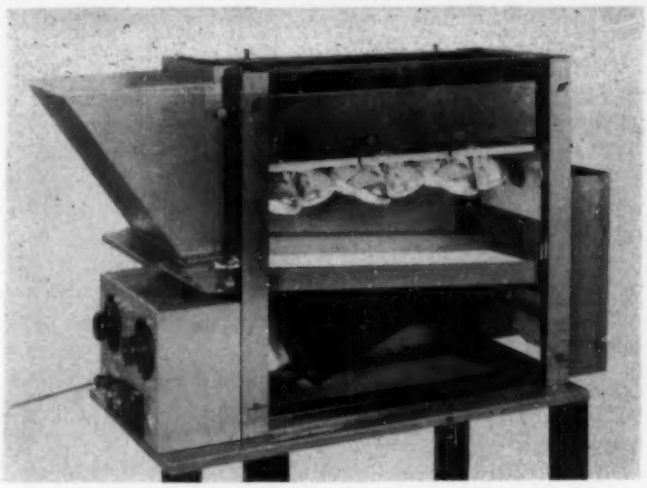


INFRA-RED LAMPS LEFT SIDE OF OVEN

HOW THESE TWO COMBINE TO HEAT A PRODUCT IN THE MIDDLE OF THE OVEN

INFRA-RED LAMPS RIGHT SIDE OF OVEN

In Fig. 4 is illustrated an automatic machine for doing just what the injection molder wants. It is equipped with three sets of four angularly directed heat lamps which not only heat the material as it vibrates over the stainless steel trough, but also heats the lower part of the hopper before the material comes out on the plate and the feeding funnel for the container that is to be used to transfer the material to the hopper of the molding machine. There is a switch on each pair of these lamps so that if the operater desires to make any variations in the heat by switching off the lamps, he may do so. It is important to observe that the infra-red heat which is generated in the filament of the



various lamps is directed into the heavy metal trough where it is stored, and from which it gives up heat from the bottom. It is estimated that about 10% of the heat delivered by the lamps goes to the surface of the material in process, and that 90% first goes into the trough before it is given up to the granules as they pass along. There is an adjustment on the hopper to vary the gap between the trough and the hopper to increase the flow of the material, or to make it fit large size granules. The machine, of course, is operated with the sides closed in. There is a flow of air

(Continued on page 14)

light but TOUGH

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SPI - SPE *(Cont'd from page 2)*

However, it was unacceptable to SPE. Our SPE Committee drafted a reply as follows:

PROPOSAL FOR THE CO-ORDINATION OF PLASTICS ENGINEERING ACTIVITIES

The Society of Plastics Engineers concurs with the Society of the Plastics Industry and P.M.M.A. in feeling that activities must be co-ordinated. Reviewing the proposals submitted February 19th, we feel that:

1. Activities could be sponsored in the engineering field by renaming S.P.E. the American Association of Plastics Engineers an independent organization.
2. Autonomy should be established by membership qualifications and dues created by and payable to the Engineering Organization.
3. Presidents of S.P.I. and A.A.P.E. to serve as members of the Board of each Societv.
4. Presidents of S.P.I., P.M.M.A. and A.A.P.E. serve as a co-ordinating committee.
5. All engineering members of S.P.I. being eligible for membership in A.A.P.E. upon payment of initial fees and dues.

These proposals are tentative and the Society of Plastic Engineers is open to consideration of modifications which will serve in the interests of the promation of the plastic industry.

NOTE: Clarifying (1) above. Our own Advisory Board has under consideration a proposal to change the name of SPE. Changing our name was mentioned indicating our own good will in approaching this mutual problem. Actually our name may remain the same.

After a number of conferences, the PMMA Committee returned with the following proposal from the SPI Board:

A PROPOSAL FOR THE UNIFICATION OF TECHNICAL AND ENGINEERING ACTIVITIES IN THE PLASTICS INDUSTRY

We agree that the Engineering Activities of the industry must be unified, and that a new autonomous group or society be organized for this purpose.

The S.P.I., because of its company membership, will provide the funds and facilities to make such unification activity possible.

The organization of this unified activity to be such as to permit:

1. Its autonomy.
   (a) Selection of its own officers.
   (b) Arranging its own programs.
   (c) Conducting its own meetings, local and National.
   (d) Governing all other engineering matters.
2. Representation on S.P.I. Board of Directors.

The details of the timing and payment of dues in connection with the transition will be left to the Committee concluding the arrangements for unification.

It is recommended that an immediate meeting be arranged between the National Council of S.P.E. and the S.P.I. Engineering Division to fix the organization, the membership qualifications, the dues structure, the name, and the officers of the new group, all to become effective at the time the memberships of both organizations approve the plan.

While the technical personnel of the industry, as represented by both S.P.E. and the present Engineering Division of the S.P.I., are to have full control over establishing eligibility standards, one stipulation must be made to protect the structure of S.P.I. company membership. This provision is to the effect that any company now qualified for S.P.I. membership under the existing by-laws should be a member in good standing of S.P.I. as a requisite for membership of their technical personnel in the new organization.

It is assumed that the expenses of the new organization will exceed the income from dues. To protect both S.P.I. and the new organization, an annual budget is to be submitted for approval to S.P.I.

The S.P.E. Executive Committee took exception to the stipulation mentioned in the 6th Paragraph of the last proposal for reasons partially expressed below:

1. On our SPE Executive Committee meeting, four members would have been excluded from this organization by reason that Member's company was a member of SPI; namely, Mr. Robert Chollar of National Cash Register Company, Mr. Carl Frosch of Bell Laboratories, Mr. Earl Russell of Spaulding Fiber Company, and Mr. Phil Marvin of the Milwaukee Gas Specialty Company.
2. Many "end-use" engineers would be excluded.
3. All junior engineers would be excluded.
4. The stipulation would not serve the best interests of the industry.

We believe the PMMA Committee is in sympathy with our position.

The above is sent to you so that you are fully informed. Your comments will be appreciated. Our feeling is that this engineering organization should be fully independent and can function best as an independent democratic organization.

Thomas E. Orr,
National President.

Infra-Red *(Cont'd from page 13)*

delivered by a small blower fan observed as the black spot to the right near the last lamp. This fan current of air pushes the moisture laden air as it arises from the hot plate, driving it into a sort of fireplace chimney duct and on out while simultaneously bringing in a fresh supply of air which is not moisture laden. Thus, it will be seen that every means possible is used to get rid of the moist air and to have fresh air available at all times to pick up the moisture. This machine is equipped with two auto transformer type of temperature controls which vary the voltage and which can be arranged to operate on any

(Continued on page 15)

SANFORD AT MIAMI VALLEY

By J. G. BRADEN

At a meeting of the new Board of Directors of the Miami Valley Section held on February 6th, the following officers were elected for the coming year:

B. C. Stupp, President; G. J. Wilson, Vice-President; J. G. Braden, Secretary-Treasurer.

The new officers were announced to the Section at their regular February meeting which followed the election.

Mr. Frank Sanford of the Celanese Plastics Corporation spoke to the February meeting and his subject was "Pre-marketing Evaluation of Plastic Materials." Mr. Sanford gave a very interesting discussion on the steps which must be followed before a plastic product is ready for merchandising. He advocated the use of physical tests on the finished product wherever possible.

Infra-Red *(Cont'd from page 14)*

pre-determined setting as read from the two dials, each of which have 100 divisions. Therefore, the heat can be turned up or down from room temperature to approximately 400 degrees with ease.

The speed of the flow is controlled by a button on the vibrator in the base of the instrument case where the speed of flow can be controlled from five pounds per hour to sixty pounds per hour, based on cellulose acetate procedure.

That brings us to the point where we should mention the mounting of the preheating device over the molding machine so that the hopper of the molding machine will be fed directly from the hopper of the infra-red preheating arrangement. A great advantage is brought out by having these temperature controls since that also acts to increase the voltage of the line to which they are connected, thereby producing much more heat than would be possible were the lamps connected directly to the line without any such controls. Assuming that the calibrations on the circular dials surrounding the adjustment knobs are 100, we may assume that at the 80 point, the heat delivered would correspond to that which would be possible were there no controls available. But, if you turn the dials down below 80, the temperature is lower and if you turn them up above 80, the temperature is increased thereby giving you greater advantage which is normally not apparent. In fact, the voltage of a 230 Volt circuit is thereby raised to 270 Volts.

INFRA-RED IN EXTRUSION MOLDING

In extrusion, the problems are met very much as they are in injection molding, except that the granules must be made as dry as practical. Tests we have made indicate that the process could be carried on for hours and there still would be moisture to remove. In injection, we seem to agree that moisture removed down to ½ of 1% will satisfy everybody, but when it comes to extrusion, much of this ½ of 1% which remains must be eliminated. Depending upon the quality of the work to be done, this can be accomplished by arranging the same machine used for injection in tandem so that the granules pass through a machine twice as long. There are extrusion applications where this would even have to be extended to a machine three times as long. It is obvious that the feeding of such preheated products into the extrusion worm directly eliminates the possible disadvantage of having the material absorb more moisture after having been dried by some other process. It should be noted also that in the tandem operation of these machines, the granules are theoretically turned over and reversed so that the particles which were down are next up on the second vibrator, and when the third virbrator is added, there is another change of position of the particles with relation to closeness to the plate.

INFRA-RED IN FABRICATION

A four-lamp BENCH KIT is made for the use of the fabricator who desires to soften sheets, rods, tubes, etc., held in a stationary position. This particular kit is obtainable in any size in units of four lamps or more, together with a temperature control if that is deemed necessary.

We have secured 1000 degrees F. with a 1000 Watt lamp in our Laboratory. In a general way, you could use a formula of one degree per Watt, although in our 250 Watt hook up, we are able to get 400 degrees under certain conditions due to the adjustability of arrangement and attention to a number of details not ordinarily considered important.

AUXILIARY EQUIPMENT

Another device which is not illustrated but which is used considerably in South America where the humidity is high, is a hopper heater. This plays an important part where the metal of the molding machine has a tendency to condense the moisture on the surface of the hopper.

A combination steam and infra-red oven will soon be offered. According to exhaustive tests by reliable engineers, it is to supercede existing electronic and induction preheating of both small and large preforms of phenolic material. The steam is said to act as a catalyst, permitting quick processing with Infra-Red Heat.

This new system was worked out by Moxness and Formo in the Minneapolis Honeywell Regulator Company laboratory and was announced formally at the SPE Convention in Chicago, January 31, 1947. A complete story appears in the February issue of SPE News.

STEAM VEYOR combines steam heat either at atmospheric pressure or varying pressures up to ten pounds as desired with variable temperature infra-red heat. It is low in price, small and compact and may be installed on either side or in front of each compression press within easy reach of the press operator. There are no cumbersome drawers. Cost of operation is less than 2 cents per hour.

STEAM VEYOR contains all the necessary controls to vary both the steam and the infra-red heat at will from 212° F. to 240° F. plus whatever the varying superheat action of the infra-red adds to these figures.

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